



## ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental  
2425 New Holland Pike  
Lancaster, PA 17601

Prepared for:

Integral Consulting Inc.  
Suite 190  
285 Century Place  
Louisville CO 80027

Report Date: September 12, 2018 16:14

**Project: Solvay**

Account #: 20003  
Group Number: 1982497  
State of Sample Origin: NJ

Electronic Copy To Integral Consulting Inc.  
Electronic Copy To Integral Consulting Inc.  
Electronic Copy To Solvay  
Electronic Copy To Solvay

Attn: Glenn Esler  
Attn: Erin Palko  
Attn: Mark Christensen  
Attn: Mitch Gertz

Respectfully Submitted,



Lyssa M. Longenecker  
Specialist

(717) 556-7321

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## SAMPLE INFORMATION

<u>Client Sample Description</u>	<u>Sample Collection</u> <u>Date/Time</u>	<u>ELLE#</u>
V-915 Grab Water	08/30/2018 14:00	9781998
Field Blank Grab Water	08/30/2018 14:00	9781999

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

**Sample Description:** V-915 Grab Water  
Solvay

**Integral Consulting Inc.**  
**ELLE Sample #:** WW 9781998  
**ELLE Group #:** 1982497  
**Matrix:** Water

**Project Name:** Solvay

**Submittal Date/Time:** 08/31/2018 10:20  
**Collection Date/Time:** 08/30/2018 14:00

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
	<b>LC/MS/MS Miscellaneous EPA 537 Version 1.1 Modified</b>		<b>ng/l</b>	<b>ng/l</b>	<b>ng/l</b>	
14473	Perfluorobutanesulfonate	375-73-5	1.0	0.26	0.86	1
14473	Perfluorodecanoic acid	335-76-2	88	0.77	1.7	1
14473	Perfluorododecanoic acid	307-55-1	1.7 J	0.43	1.7	1
14473	Perfluoroheptanoic acid	375-85-9	110	0.34	0.86	1
14473	Perfluorohexanesulfonate	355-46-4	2.7	0.34	1.7	1
14473	Perfluorohexanoic acid	307-24-4	44	0.34	1.7	1
14473	Perfluorononanoic acid	375-95-1	14,000	34	170	100
14473	Perfluoro-octanesulfonate	1763-23-1	9.7	0.34	1.7	1
14473	Perfluorooctanoic acid	335-67-1	1,600	2.6	8.6	10
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	0.26	0.86	1
14473	Perfluorotridecanoic acid	72629-94-8	1.0	0.34	0.86	1
14473	Perfluoroundecanoic acid	2058-94-8	270	0.34	1.7	1

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary.

The recovery for labeled compounds used as extraction standards 13C3-PFHxS and 13C4-PFHpA is outside of QC acceptance limits as noted on the QC Summary due to the matrix of the sample.

The sample injection internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

## Sample Comments

State of New Jersey Lab Certification No. PA011

## Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18249002	09/07/2018 17:32	Devon M Whooley	1
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18249002	09/12/2018 13:32	Devon M Whooley	10
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18249002	09/12/2018 13:41	Devon M Whooley	100
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18249002	09/06/2018 08:00	Courtney J Fatta	1

\*=This limit was used in the evaluation of the final result

**Sample Description:** Field Blank Grab Water  
Solvay

**Integral Consulting Inc.**  
**ELLE Sample #:** WW 9781999  
**ELLE Group #:** 1982497  
**Matrix:** Water

**Project Name:** Solvay

**Submittal Date/Time:** 08/31/2018 10:20  
**Collection Date/Time:** 08/30/2018 14:00

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
<b>LC/MS/MS Miscellaneous</b>		<b>EPA 537 Version 1.1 Modified</b>	<b>ng/l</b>	<b>ng/l</b>	<b>ng/l</b>	
14473	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.90	1
14473	Perfluorodecanoic acid	335-76-2	N.D.	0.81	1.8	1
14473	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.8	1
14473	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	0.90	1
14473	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	1.8	1
14473	Perfluorohexanoic acid	307-24-4	N.D.	0.36	1.8	1
14473	Perfluorononanoic acid	375-95-1	1.6 J	0.36	1.8	1
14473	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.36	1.8	1
14473	Perfluorooctanoic acid	335-67-1	N.D.	0.27	0.90	1
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	0.27	0.90	1
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	0.36	0.90	1
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	0.36	1.8	1

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary.

## Sample Comments

State of New Jersey Lab Certification No. PA011

## Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18249002	09/07/2018 17:41	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18249002	09/06/2018 08:00	Courtney J Fatta	1

\*=This limit was used in the evaluation of the final result

## Quality Control Summary

Client Name: Integral Consulting Inc.  
Reported: 09/12/2018 16:14

Group Number: 1982497

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

### Method Blank

Analysis Name	Result ng/l	MDL** ng/l	LOQ ng/l
Batch number: 18249002	Sample number(s): 9781998-9781999		
Perfluorobutanesulfonate	N.D.	0.30	1.0
Perfluorodecanoic acid	N.D.	0.90	2.0
Perfluorododecanoic acid	N.D.	0.50	2.0
Perfluoroheptanoic acid	N.D.	0.40	1.0
Perfluorohexanesulfonate	N.D.	0.40	2.0
Perfluorohexanoic acid	N.D.	0.40	2.0
Perfluorononanoic acid	N.D.	0.40	2.0
Perfluoro-octanesulfonate	N.D.	0.40	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0
Perfluorotetradecanoic acid	N.D.	0.30	1.0
Perfluorotridecanoic acid	N.D.	0.40	1.0
Perfluoroundecanoic acid	N.D.	0.40	2.0

### LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18249002	Sample number(s): 9781998-9781999								
Perfluorobutanesulfonate	4.81	4.56	4.81	4.26	95	89	73-128	7	30
Perfluorodecanoic acid	5.44	5.68	5.44	4.97	104	91	69-148	13	30
Perfluorododecanoic acid	5.44	5.16	5.44	5.09	95	94	75-136	1	30
Perfluoroheptanoic acid	5.44	5.28	5.44	5.20	97	96	76-140	2	30
Perfluorohexanesulfonate	5.14	5.01	5.14	4.76	97	92	71-131	5	30
Perfluorohexanoic acid	5.44	5.16	5.44	5.06	95	93	75-135	2	30
Perfluorononanoic acid	5.44	7.71	5.44	11.6	142	213*	72-148	40*	30
Perfluoro-octanesulfonate	5.20	5.53	5.20	5.07	106	98	67-138	9	30
Perfluorooctanoic acid	5.44	5.39	5.44	5.88	99	108	72-138	9	30
Perfluorotetradecanoic acid	5.44	5.52	5.44	5.45	101	100	74-135	1	30
Perfluorotridecanoic acid	5.44	4.90	5.44	5.30	90	97	61-145	8	30
Perfluoroundecanoic acid	5.44	5.03	5.44	5.89	92	108	75-146	16	30

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Integral Consulting Inc.  
Reported: 09/12/2018 16:14

Group Number: 1982497

## Labeled Isotope Quality Control

Labeled isotope recoveries which are outside of the QC window are confirmed unless otherwise noted on the analysis report.

Analysis Name: PFAS in Water by LC/MS/MS  
Batch number: 18249002

	13C3-PFBS	13C5-PFHxA	13C3-PFHxS	13C4-PFHpA	13C8-PFOA	13C8-PFOS
9781998	129	121	128*	131*	98	99
9781999	102	95	95	98	104	106
Blank	109	105	100	100	111	111
LCS	105	103	94	95	106	99
LCSD	103	102	91	90	100	102
Limits:	26-148	35-138	34-126	35-126	48-122	50-121
	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTeDA	
9781998	84	105	93	104	110	
9781999	114	111	112	111	102	
Blank	114	120	110	105	111	
LCS	112	105	112	109	97	
LCSD	103	106	102	99	95	
Limits:	41-144	47-125	30-128	39-130	26-119	

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.



**Lancaster Laboratories  
Environmental**

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Acct. #	20003	Group #	19049	Sample #	9751998-99
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**COC #** 556284

[illegible]

Sample Administration  
Receipt Documentation Log

Doc Log ID: 225779



Group Number(s): 1982497

Client: Solvay**Delivery and Receipt Information**

Delivery Method:	<u>Fed Ex</u>	Arrival Timestamp:	<u>08/31/2018 10:20</u>
Number of Packages:	<u>1</u>	Number of Projects:	<u>1</u>
State/Province of Origin:	<u>NJ</u>		

**Arrival Condition Summary**

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace $\geq$ 6mm:	N/A
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	1
Samples Intact:	Yes	Trip Blank Type:	See Below
Missing Samples:	No	Air Quality Samples Present:	No
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Trip Blank Type(s): 250 ml plastic unpres

*Unpacked by Carolyn Cymys (964) at 13:27 on 08/31/2018***Samples Chilled Details***Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.*

<u>Cooler #</u>	<u>Thermometer ID</u>	<u>Corrected Temp</u>	<u>Therm. Type</u>	<u>Ice Type</u>	<u>Ice Present?</u>	<u>Ice Container</u>	<u>Elevated Temp?</u>
1	DT42-03	1.0	DT	Wet	Y	Bagged	N



# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

<b>BMQL</b>	Below Minimum Quantitation Level	<b>mL</b>	milliliter(s)
<b>C</b>	degrees Celsius	<b>MPN</b>	Most Probable Number
<b>cfu</b>	colony forming units	<b>N.D.</b>	non-detect
<b>CP Units</b>	cobalt-chloroplatinate units	<b>ng</b>	nanogram(s)
<b>F</b>	degrees Fahrenheit	<b>NTU</b>	nephelometric turbidity units
<b>g</b>	gram(s)	<b>pg/L</b>	picogram/liter
<b>IU</b>	International Units	<b>RL</b>	Reporting Limit
<b>kg</b>	kilogram(s)	<b>TNTC</b>	Too Numerous To Count
<b>L</b>	liter(s)	<b>µg</b>	microgram(s)
<b>lb.</b>	pound(s)	<b>µL</b>	microliter(s)
<b>m3</b>	cubic meter(s)	<b>umhos/cm</b>	micromhos/cm
<b>meq</b>	milliequivalents	<b>MCL</b>	Maximum Contamination Limit
<b>mg</b>	milligram(s)		
<b>&lt;</b>	less than		
<b>&gt;</b>	greater than		
<b>ppm</b>	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.		
<b>ppb</b>	parts per billion		
<b>Dry weight basis</b>	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.		

**Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.**

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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# Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value $\geq$ the Method Detection Limit (MDL or DL) and $<$ the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column $>40\%$ . The lower result is reported.
P^	Concentration difference between the primary and confirmation column $>40\%$ . The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column $>100\%$ . The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.

Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.